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Stephen Plog

University of Virginia, plog@virginia.edu

Carrie Heitman

University of Nebraska-Lincoln, cheitman2@unl.edu

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Hierarchy and social inequality in the American Southwest, A.D. 800–1200

Stephen Plog¹ and Carrie Heitman

Department of Anthropology, University of Virginia, Charlottesville, VA 22904

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Chaco Canyon in northwestern New Mexico has been the focus of much recent archaeological research on Pueblo groups who lived during the 9th through 12th centuries in the American Southwest. Here, we examine variation in mortuary patterns in the canyon, focusing in particular on one mortuary crypt, to address questions of social differentiation and the chronology of important sociopolitical processes. Based on new radiocarbon dates as well as reanalysis of the stratigraphy and spatial distribution of materials in the mortuary crypt, we conclude that significant social differentiation began in Chaco ca. 150–200 y earlier than suggested by previous research. We argue that social inequality was sanctified and legitimized by linking people to founders, ancestors, and cosmological forces.

Chaco Canyon | archaeology | culture change | mortuary practice | cosmology

The Chaco Canyon region of the American Southwest (Fig. 1)—a national park and United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage site—has fascinated and puzzled explorers and scholars since the late 19th century. Located in northwestern New Mexico, the canyon is famous for its unusual architecture and the dense packing of at least 15 large, multistory masonry pueblos with core and veneer architecture, buildings referred to as great houses. The ancestors of contemporary Pueblo people constructed the buildings using a labor-intensive process that required tons of stone to be quarried and shaped and more than 200,000 trees to be harvested and transported from wooded areas as far as 70 km away. Chacoans erected these great houses, along with hundreds of 5- to 30-room small houses with simpler masonry walls, within a remarkably short 16-km stretch of the canyon. They also engineered extensive paths or roads connecting great houses to the hinterland, observed and marked such important celestial events as solstices and equinoxes, and imported tens of thousands of ceramic vessels from nearby regions as well as cacao, macaws, and copper bells from Mexico.

The Chacoan era represents one of the most remarkable examples of rapid, multifaceted culture change in the prehispanic New World. The florescence began by the first half of the ninth century, but much of the construction, including the expansion of existing great houses and the erection of several new ones, occurred between A.D. 1020 and 1120 (1). After A.D. 1080–1090, building activity declined; new constructions ceased by ca. A.D. 1115–1120, and the canyon was largely depopulated by A.D. 1130–1150. Scholars agree that Chaco was central to many dimensions of Pueblo life during the 9th through early 12th centuries in the northern American Southwest—New Mexico, northern Arizona, southern Utah, and southwestern Colorado. As a result, recent research has concentrated on the canyon or on relations with Chaco (2–6).

Our knowledge of Chaco results from a long legacy of research. The canyon was the focus of one of the first major excavation projects in the New World, the Hyde Exploring Expedition. Initiated by the American Museum of Natural History in 1896 and led by George Pepper and Richard Wetherill,

the Hyde Expedition excavated Pueblo Bonito, the largest canyon great house and one of the oldest (7). National Geographic and the Smithsonian Institution sponsored additional excavations at Pueblo Bonito from 1921 to 1927 under the direction of Neil Judd (8, 9). The University of New Mexico and the School of American Research subsequently directed several seasons of fieldwork in the 1930s and 1940s, and the National Park Service supported a major research program, referred to as the Chaco Project, in the 1970s and 1980s (4, 5).

Nevertheless, our understanding of Chaco remains contested. Some believe Chaco represents one of the best North American examples of the evolution of chiefly societies based on institutionalized leadership with significant status differentiation (10, 11); in contrast, others suggest Chaco was egalitarian, and the massive construction was a cooperative effort coordinated by ephemeral leaders with minimal power (12–15). Some have proposed the great houses were populous communities comparable with historic Pueblos, whereas others argue that they had a small resident population that was seasonally supplemented by hundreds, if not thousands, of pilgrims who flocked to the canyon for ceremonies and ritual festivals (6, 15). Although all scholars acknowledge that great house construction began by the mid-ninth century, there is debate about whether the intense period of activity in the 11th century was a short-term response to contemporary social and environmental changes or the product of long-term historical trajectories that began to unfold with important social and ritual changes initiated at or soon after the initial erection of great houses in the ninth century.

In this paper, we address sociopolitical differentiation and long-term social dynamics in Chaco through an analysis of the mortuary behavior of the canyon inhabitants, particularly a long-recognized paradox: cemeteries are common at small house settlements, but none have been found associated with great houses. Our study first considers information on small house sites and then, examines a set of burial-related rooms in a single great house. We conduct our study by applying modern analytical techniques to published data as well as information from the rich, but often overlooked, archival sources. After examining the spatial distribution of materials in a significant key mortuary crypt along with new accelerator mass spectrometry (AMS) radiocarbon dates on burials from the crypt, we conclude that important social, ritual, and cosmological connections—key ritual principles and relationships with social, economic, and political dimensions (16)—were evident in the form and content of Chacoan houses and mortuary complexes. We also suggest significant social differentiation occurred in Chaco as early as the late ninth century and was sanctified and legitimized by linking people to founders, ancestors, and cosmological forces.

Author contributions: S.P. and C.H. designed research, performed research, analyzed data, and wrote the paper.

The authors declare no conflict of interest.

Data deposition: The data reported in this paper have been deposited in the Chaco Archive database, www.chacoarchive.org.

¹To whom correspondence should be addressed. E-mail: plog@virginia.edu.

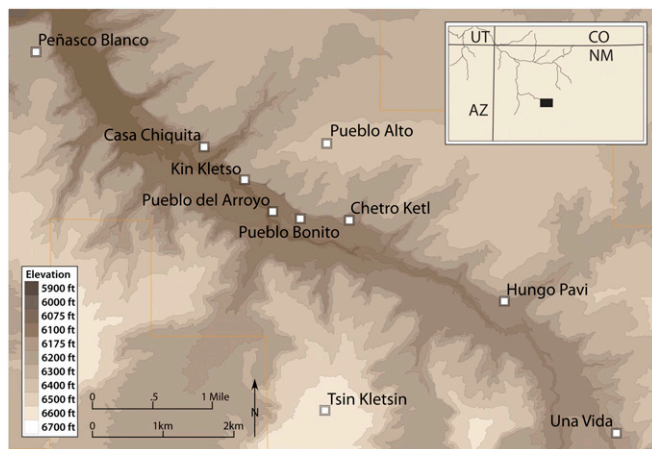


Fig. 1. Geographical locations of some of the major great houses in Chaco Canyon. *Inset* shows the location of Chaco Canyon in the American Southwest.

Chacoan Mortuary Patterns: Small Houses

Some scholars have concluded that burials were uncommon in the canyon as a whole, perhaps because the canyon population may have been mobile, living in the canyon only part of the year, and thus, may have died and been buried in other locations (17–19). Akins (20), however, has documented the recovery of more than 270 individuals from professional excavations of more than 30 small houses. This total is comparable with, if not larger than, contemporaneous areas, where intensive excavations at dozens of settlements have been conducted using modern excavation and recording procedures (21).

In addition to the known burials, several other factors also must be considered in evaluating the number of burials recovered from small houses. First, the recent excavations of the Chaco Project—the only extensive excavation project in Chaco Canyon in the last 70 y—focused on masonry rooms, pithouses, and kivas with limited trenching in the trash middens where Chacoan small house residents typically interred their dead. Second, there are very few publications documenting the frequent professional excavation of small houses in the 1930s and 1940s. Existing field records are quite good for some of these sites and sparse for others; our understanding of many of these sites and their burial populations is, thus, incomplete.

Third, archival records reveal that excavation of small house cemeteries in the canyon by both professionals and nonprofessionals was frequent from the 1880s to the 1930s. Over the last 6 y, we have been fortunate to direct a cooperative effort among Chacoan scholars and experts in digital preservation and communication to collect and disseminate a substantial portion of the unpublished historical record of Chacoan research through the Chaco Research Archive (www.chacoarchive.org). We have found frequent allusions in those historical records to previously undocumented or overlooked excavations of Chaco burials. The search by both professionals and nonprofessionals for pottery associated with the burials in the small-house mounds began before the Hyde Expedition and continued through subsequent decades.

Early scholars often noted the ease with which cemeteries could be identified and burials excavated. Beginning as early as the 1890s, professionals and “pot hunters ran drifts into every large refuse mound between Pueblo Pintada and the mouth of the Escarvada (*sic*) Wash” (ref. 22, p. 224). During a short visit to Chaco in the spring of 1897, for example, Moorehead (23) collected 40–50 pots at a cemetery about 1 mi from Pueblo Bonito. Data on documented excavations (20) reveal an average of 1.5 vessels per small-house burial. Thus, we can estimate that, in

a single cemetery, Moorehead (23) recovered ~25–35 burials. In addition, numerous letters and reports (24, 25) mention frequent excavations by the Navajo and Anglo pothunters in search of turquoise or other artifacts that could be sold.

In the late 19th and early 20th centuries, the poor preservation of the skeletons—often found less than 0.5 m below the surface—was not a concern. The professional excavators were not interested in the postcranial skeletons but rather, the associated pottery vessels and other burial goods for display in the museums and the skulls for comparative craniometric studies. Many of the nonprofessionals were gathering pottery and other artifacts for sale. At the turn of the century, the curio trade in such items boomed as many Americans became more interested in Native American cultures and began purchasing both historic and prehispanic craft items from an expanding network of trading posts and curio dealers (26). Moreover, these dealers often sold materials to museums for their collections, blurring the dichotomy between professional and nonprofessional.

The demand for prehispanic artifacts was so strong and Chaco was such a lucrative area that when Aleš Hrdlička sought to recover burials from Chaco in 1899, he concluded that “the mounds that Mr. Wetherill spoke of did not yield anything, they were ransacked by Navajos” (ref. 25, p. 3). Similarly, when Judd first traveled to Chaco in 1920, he noted that none of the burial mounds associated with small-house settlements were undisturbed. Equally significant, he concluded, “By far the larger proportion of antiquities found in our museums credited to the Chaco Canyon has come from the burial mounds or refuse heaps associated with these smaller ruins. Since they promised greater return for the time and effort expended, these refuse heaps ... have received most attention both from pot-hunters and museum representatives on hurried visits to the region” (ref. 27, p. 18).

Based on this information, we conclude that there is a large body of evidence—skeletal, archaeological, and archival—to suggest that the known burials from Chaco significantly underestimate the actual number of individuals who were once interred in the canyon. Although the inhabitants of small houses occasionally buried their dead in or under the floor of rooms in the pueblo, most were interred in trash middens. Burial mounds, as the early archaeologists referred to these mounded deposits full of graves, were, thus, typically associated with the scores of small houses throughout the canyon.

Microcosm: Great-House Burial Complex

In contrast to the small houses, the early archaeological explorations of Chaco great houses found no cemeteries in trash mounds or other areas surrounding the pueblos, despite exploration of the area surrounding Bonito by both the Hyde Expedition and the National Geographic Society. In the only thoroughly explored, large great house—Pueblo Bonito—burials were only recovered within rooms, and their frequency was far lower than expected for a pueblo once thought to have had as many as 1,000 inhabitants (8). As a result, some scholars now conclude from this and other evidence that few people lived in great houses and propose that the pueblos primarily had a ritual rather than domestic function (3). Based on our understanding of one of the two primary mortuary crypts in Pueblo Bonito, we outline an alternative explanation for the relative paucity of great house burials, which has important implications for our understanding of the development of social hierarchies.

Our analysis focuses on Pueblo Bonito, the largest and best known of the Chaco great houses, with ~650 rooms. Bonito was one of the first three great houses constructed in the canyon, possibly the earliest and longest occupied. The pueblo was centrally located relative to both the early and later great houses, and several decades after it was founded, it lay amid the densest concentration of great houses in the canyon. Bonito also contained the richest artifact assemblages recovered from the handful

of excavated great houses. For these and other reasons, many regard Pueblo Bonito as the ritual and sociopolitical center of the Chacoan world (3, 6).

Bonito was almost completely excavated by the Hyde Expedition and the National Geographic Project and thus, is the best-known great house. Collectively, these excavations uncovered fewer than 200 burials within Pueblo Bonito. Most human remains were concentrated in two mortuary crypts (Fig. 2), each consisting of four masonry rooms. The practice of burying the dead within rooms was uncommon in the northern American Southwest throughout the prehispanic era. The western crypt included four contiguous rooms—numbers 320, 326, 329, and 330—constructed at about A.D. 860 based on tree-ring dates and architectural patterns. The northern crypt also consisted of four adjacent rooms—numbers 32, 33, 53, and 56—erected by the last half of the ninth century (28, 29). Neither set of rooms could be entered directly from the plaza and thus, were not easily accessible.

Both mortuary crypts yielded not only burials but also substantial grave goods that included a variety of ritual paraphernalia. However, our analysis focuses on the northern crypt for two reasons. First, two burials found in the northern crypt are widely regarded as possible leaders of Pueblo Bonito, if not the canyon as a whole. Associated with those burials in Room 33 were tens of thousands of turquoise beads and pendants that comprise a large portion of all of the turquoise jewelry ever recovered from the canyon—constituting more than 80% of all turquoise found in Chaco—as well as large quantities of shell and jet and highly unusual artifacts such as flutes, wooden ceremonial staffs, cylinder jars, and conch shell trumpets. As a result, the crypt has been the most frequently mentioned context (burial or nonburial) in Chaco and has often been regarded as a sacred precinct or ritual center for the great house and canyon as a whole (30). Ashmore (31) has gone one step further and argued, based on the inaccessibility of the rooms, the wealth of turquoise and other materials, and the importance of north in Pueblo cosmology, that the room may have emphasized connections with founding ancestors through hidden ritual activity. In many Pueblo groups, prayers are offered sequentially to the four directions, beginning with the north, where some Pueblos believe they first emerged from the underworld (32, 33).

Second, although the northern burial rooms were among the earliest constructed at Bonito, the burials and rich assemblages are widely regarded as dating between A.D. 1020 and 1100 (6, 29, 34, 35), concurrent with a surge in building activity throughout the canyon. Given this relatively short duration for much of the building activity, the production of large amounts of turquoise ornaments acquired from raw material mined at least 170 km

away, and trade to acquire materials such as shell and macaws, most have concluded that evidence for sociopolitical complexity in Chaco dates only to the last several decades of the 11th century. Many have, thus, argued that significant social differentiation was ephemeral, at best, or most of the activity could have been led by “a few charismatic, forceful individuals” (ref. 13, p. 135) who, at death, were buried in the northern crypt accompanied by large quantities of turquoise and shell jewelry. Our analysis of the northern crypt, however, offers reasons to question these conclusions.

In addition to a monograph (7) and an article (36) on his excavations in the northern crypt, Pepper left a substantial body of unpublished notes and drawings in the archives of the American Museum of Natural History, the National Museum of the American Indian, and the Latin American Library at Tulane University. Although the consistency of Judd’s notes on room excavations is better overall than Pepper’s notes, Pepper’s notes for Rooms 32 and 33 provide detailed measurements (36, 37) that are often lacking in Judd’s records. Pepper, at times, used pioneering methods that did not become common in Southwestern archeology for several decades. He described and sketched associations among some skeletal elements and artifacts. He measured the distance of skulls and some associated artifacts from the walls and ceiling beams of the rooms. Some of this information was not, however, included in his publications and thus, has not been considered during previous discussions of the rooms. Examination of these archival records, supplemented by analyses of the materials and skeletons recovered, has allowed us to build a more thorough description of the distribution of cultural materials in the rooms and an understanding of the depositional patterns.

We focus not just on the types and abundance of material but also on their spatial distribution, because one of the long-standing questions regarding these rooms is whether they were disturbed after Chacoans left the canyon. The spatial distribution of skeletal remains in Room 33 and in the rooms of the western mortuary complex uncovered by Judd has often been disregarded, if not dismissed. Rather than the complete articulated skeletons that typify the prehispanic era of the Pueblo Southwest, a pattern already known at the time of the Hyde Expedition, instead, many of the skeletal remains in Room 33 and the western mortuary crypt were disarticulated, with individual bones scattered within the rooms. In one room of the Western complex, for example, Judd (8) found six crania, vertebrae, and ribs clustered in a corner along with ceramic vessels and baskets.

Given the expectation that burials would be complete and articulated, both Judd (8) and Pepper (7, 36) sought explanations for the disarticulated remains they encountered. Judd (8) ultimately concluded that enemies searching for turquoise and shell ornaments had vandalized the burial crypts. Alternatively, Pepper (7, 36) concluded the disarticulated and in some cases, fragmentary burials that he recovered in Room 33, with the exception of Burials 13 and 14 and two others, did not reflect their original deposition but had been disrupted by water that flowed through the eastern doorway after rains. We argue below that these interpretations are incorrect and that there is much to be learned about mortuary patterns at Pueblo Bonito from a more detailed analysis of the distribution of materials.

Although Pepper (7, 36) found burials in Rooms 53 and 56, our analysis will focus on Room 33 where most of the burials were found, with some discussion of Rooms 28 and 32, which had to be entered to gain access to Room 33. Together, these three rooms revealed what many regard as the most remarkable assemblage of materials ever discovered in the Pueblo Southwest.

Room 28. Pepper and Wetherill began their work near the northern burial cluster by first exposing Room 28, where they encountered more than 100 unusual cylinder vessels that subsequently have been found only rarely outside of Chaco Canyon,

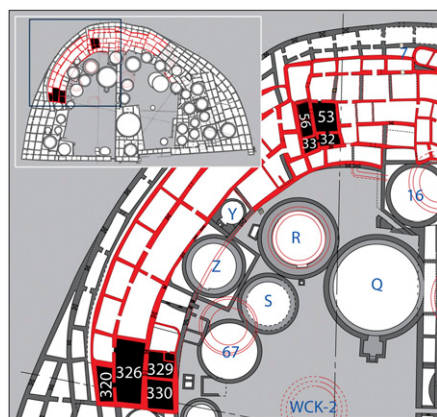


Fig. 2. Plan view of Pueblo Bonito highlighting the locations of the two major burial crypts.

with the vast majority recovered from Pueblo Bonito (38). Recent analysis of residues in the fragments of these vessels recovered from the Bonito trash mounds revealed that at least some of the vessels contained residues of cacao, suggesting that Chacoans drank a type of chocolate beverage (39). Such beverages were an important component of Mesoamerican rituals.

Room 32. Pepper next removed the masonry that closed a door in the northwestern corner of the room that had at one time allowed entry into Room 32. Pepper fortunately recognized that Room 32 had been used for ceremonial purposes, and therefore, he measured and sketched the locations of many of the materials uncovered. Because our focus is primarily on the burials discovered in Room 33, we highlight only three aspects of Room 32 relevant to the question of formation processes in both Rooms 32 and 33. First, 10 cm from the western wall of Room 32 and extending north to the doorway between Rooms 32 and 33 was a partial skeleton consisting of the pelvis, sacrum, and 10 vertebrae, with ribs, a clavicle and scapula, a tooth, and a left femur, but not a skull, scattered nearby. Wrapped about the bones was a mass of burned cloth that extended into the Room 32–33 doorway. Perpendicular and just northwest of the vertebrae were eight sticks lying roughly parallel to each other. They had been placed at an angle with one end of the sticks resting against the lower part of the vertebrae (37). Just northeast and parallel to the vertebrae was a wooden ceremonial staff. Another set of eight burned sticks was scattered nearby.

Second, Pepper found a cache of >300 wooden ceremonial sticks in the northwest corner. Between the cache and the northwest walls, he also found a quiver with 81 arrows made of reeds. The ends of the ceremonial sticks and arrows that were covered with soil were not as well preserved as the exposed portions, but the preservation of these unusual and fragile materials was nevertheless quite good.

Third, Pepper observed and sketched a pattern in the stratigraphic layers in the western part of the room underneath the burial. An initial layer of sand had been deposited followed by a layer of black soil. This sequence was repeated a second time and then, capped with a final layer of sand (7, 37). The individual layers ranged in thickness from 2.5 to 12.5 cm. Pepper suggested that these layers had been deposited before placement of the burial.

The highly patterned association of the vertebrae and pelvis with burial goods, the preservation of the ceremonial sticks, arrows, and cloth, and the patterned stratigraphic sequence suggest that the flow of water had not disturbed the western end of the room. In addition, given the partial burial and associated items and the cache that lay just southeast and northeast, respectively, of the door into Room 33, we conclude it is improbable that water flowed from Room 32 into Room 33.

Room 33. Room 33 held the remains of at least 14 individuals and the richest assemblage of artifacts ever uncovered in the Pueblo Southwest, although it is one of the smallest rooms in the pueblo with dimension of $\sim 2 \times 2$ m. More than 30,000 objects were recorded and cataloged from this small room. Most (>95%) of these objects were beads, pendants, or other items made from minerals such as turquoise and jet or shell. More turquoise, at least 25,000 pieces, was recovered from this one small room than from all other prehistoric sites in the entire Southwest combined (40). This total is all the more remarkable given the excavation methods of the time: most sediment was not screened but merely picked over. Equally noteworthy are many unusual items such as two cylinder jars, almost two dozen wooden ceremonial sticks, a shell trumpet, two cylindrical baskets covered with turquoise and shell mosaic, and nine flutes. The wooden flutes are the only ones ever recovered from Chaco Canyon and are rare throughout the northern American Southwest.

We consider the associated artifactual remains in more detail below, but we first focus on the skeletal remains that have received surprisingly little attention, except for the two richest burials. Two of the individuals were discovered in situ, and two others had most of the skeletal elements in place; 10 additional skeletons were in various states of articulation and disarticulation.

Pepper's measurements, drawings, and discussions (7, 36, 37) reveal strong associations among some burials, particularly numbers 5, 13, and 14, and their associated burial goods. The denser concentrations of artifacts and burials in the eastern one-half of the room also indicate that material had not been moved away from the Room 32–33 doorway, again suggesting that Pepper's hypothesis of major water flow was incorrect. In addition, Pepper notes that, with one exception, the sediment in Room 33 was very dry (7), an observation consistent with the remarkable preservation of cloth, flutes, and the wooden ceremonial staff in the room, similar to Room 32.

As noted above, Rooms 28, 32, and 33 were among the first constructed at Pueblo Bonito (1, 28, 29). The only tree-ring date clearly associated with the construction of Room 33, a lintel from the door between Rooms 32 and 33, is A.D. 852, but the tree is missing outside growth rings and thus, does not date the death of the tree. Better-dated rooms nearby, however, indicate construction of most of the northern rooms between in the last half of the 9th to the early 10th centuries. Nevertheless, most scholars have argued, largely based on temporally diagnostic decorative styles on ceramic vessels, that placement of the burials and artifacts in Room 33 began after A.D. 1020–1030 (6, 29, 34, 35). Akins (11), however, has suggested the ceramic decorative styles from the room were more diverse and could indicate deposition over a time span as long as 175 y. Our own examination of the ceramic vessels supports Akins (11). We found that decorative styles range from Red Mesa designs characteristic of the period from A.D. 875 to 1040 to designs more typical of the late 11th and early 12th centuries (41). Further challenging the conventional dating of Room 33 are two AMS radiocarbon dates for Burials 13 and 14, with median dates of A.D. 821 (2- σ interval of 690–944) and 817 (2- σ interval 690–940), respectively (42).

We have further explored the chronology of the burial room in two ways. First, by using Pepper's measurements, we created a 3D plot of the distribution of the skeletal elements, primarily skulls, and some artifacts. Fig. 3 illustrates the west to east distribution of skeletal remains and some artifacts in the room relative to their depth from the ceiling beams. (Given that each room has multiple ceiling beams and they typically differ in diameter, Pepper's depth measurements likely have an error factor as high as 15 cm.) Burial 14 was the first placed in the room on a prepared surface of wood ashes on top of a leveled floor of yellow sand. The room then filled with slightly more than 0.7 cm of soil that contained only a small number of artifacts before a second body, Burial 13, was interred. Slightly above Burial 13, a wooden floor consisting of carefully crafted planks was laid across the entire room. (By the time of Pepper's excavation, the planks had warped somewhat, and Pepper does not specify the location of his measurement; therefore, Fig. 3 does not illustrate the one depth measurement that Pepper provides.) Interring Burial 13 and laying the planks may have happened within a very short time period, because Pepper's notes indicate that part of the jaw of the burial was found above the floor. After the wooden floor was in place, most artifacts mapped by Pepper were deposited within the initial 0.2 m of soil that accumulated. Burials, however, vary in depth from almost on top of the plank floor to ~ 0.5 m above it. Thus, consistent with the time span suggested by ceramic decorative diversity, the distribution of burials and artifacts in Room 33 is stratigraphically complex with the lowermost and uppermost burials separated by 1.2 m.

Second, we dated eight skeletal samples from Room 33 and also obtained dates from a different laboratory on additional

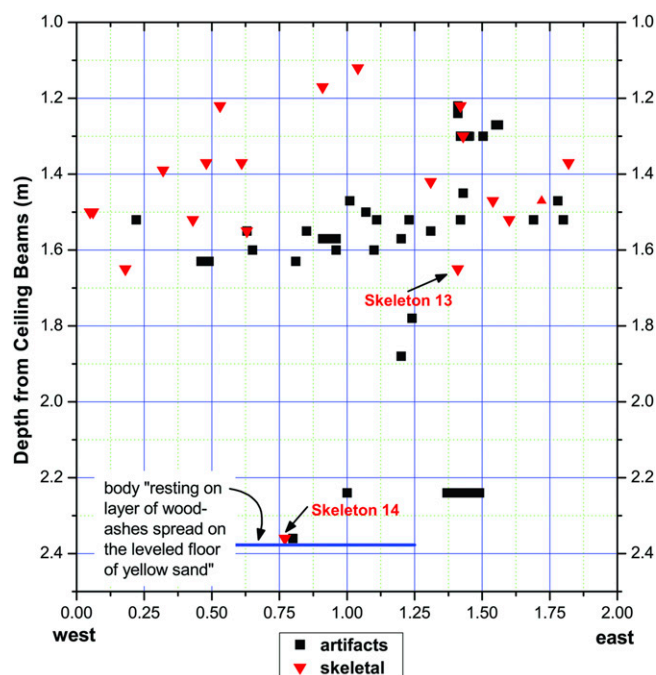


Fig. 3. Plot of the distance from the ceiling beams of skeletal remains and some artifacts in Room 33 in relation to their west to east distribution in Room 33.

collagen from Burials 13 and 14. The AMS dates for burial numbers 1–12 are for femora that, at some point in time, had received letter designations. Either during initial collection of the skeletons by Pepper or during subsequent storage at the American Museum of Natural History when Pepper returned to New York, cranial and postcranial remains for all burials except numbers 13 and 14 were separated. Skulls were individually numbered and cataloged, but postcranial remains were grouped in one accession, with some skeletal elements labeled with alphabetic designations. No records of which numbered skull was associated with postcranial bones have been found in Pepper's archives.

All dates were calibrated using Oxcal 4.1 (<http://c14.arch.ox.ac.uk>) and are presented in Table 1. Fig. 4 illustrates the medians and 1- and 2- σ ranges for all dates from the room.

The recently acquired dates for Burials 13 and 14, found below the wooden floor, are consistent with the two reported earlier (42). Using Oxcal's R_combine measure to average the pairs of

samples, the median for Burial 13 is A.D. 781, with a 2- σ range of 691–877. For Burial 14, the median is A.D. 873, with a 2- σ range of 690–873. The vertical separation (0.56 m) of Burials 13 and 14 and their similar dates suggest that the sand separating the two individuals did not accumulate naturally but rather, was intentionally brought into the room. Pepper (7) also proposed that both individuals may have been buried at the same time.

The dates for Burials 13 and 14 also match a date from a third individual (femur B; AA87367) found above the wooden floor. Based on the probability distributions and the 2- σ ranges for the three earliest individuals, it is likely that Burials 13 and 14 and femur B were interred by the end of the ninth century. Given the dates of the three skeletons, it is possible the interment of Burials 13 and 14, the placement of the plank floor, and the addition of a third individual may have occurred within a period of decades.

A fourth burial (femur A; AA87366) was added to the room sometime during the late 9th or the 10th century. Collectively, the dates for these four individuals show that the prior hypotheses that the burials occurred sometime after A.D. 1020 should be rejected. The remaining six burials were interred sometime during the 10th, 11th, and 12th centuries.

The dates, in combination with those reported previously, suggest that interment in Room 33 began soon after the initial construction of Pueblo Bonito. Tree-ring dates indicate construction of the earliest rooms in the mid-eighth century. However, the early date range for Burials 13 and 14 in combination with structures discovered underneath the great house by both Pepper and Judd also raise the possibility that some construction, along with the death of Individuals 13 and 14 and the person represented by femur B, may have occurred earlier than suggested by the tree-ring dates. The individuals first entombed could have been among the founders of the great house. The use of Room 33 as a mortuary chamber dates to the earliest phase of occupation of Pueblo Bonito and continued into the late 11th and possibly early 12th centuries, potentially a span of 300–400 y.

The long period during which burials were periodically interred above the wooden floor provides a likely explanation for the disarticulation of most of the skeletons above the floor. The individuals buried averaged 162 cm in height (20), only a few centimeters shorter than the width of the room. When placing new bodies in such a cramped, dark space, it would have been difficult not to disturb prior interments, particularly given that the 12 burials above the floor were all placed within a deposit no more than 0.5-m thick. An additional possibility may be that some of the interments were secondary burials that had first been placed elsewhere and then later moved into Room 33 after the soft tissue

Table 1. Radiocarbon dates and calibrations for burials from Room 33, Pueblo Bonito, Chaco Canyon, NM

Sample no.	Skeleton or skeletal element	Radiocarbon age	\pm	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	Calibrated age range A.D. (95.4%)	
						From	To
AA57713	Burial 13	1209	40	–6.8	12.4	690	944
AA57715	Burial 14	1213	40	–7.1	11.4	690	940
CAMS147522	Burial 13	1245	25	–6.8	—	682	870
CAMS147523	Burial 14	1240	25	–7.1	—	687	870
AA87366	Femur A	1143	44	–10.6	11.8	776	989
AA87367	Femur B	1223	44	–9.0	11.2	676	894
AA87368	Femur D	969	48	–9.5	11.6	985	1181
AA87369	Femur L	1025	44	–9.3	10.4	895	1153
AA89069	Femur E	928	36	–9.6	10.0	1023	1185
AA89070	Femur F	930	36	–9.6	11.3	1023	1185
AA89071	Femur G	1018	55	–10.7	11.4	895	1156
AA89072	Femur I	945	54	–9.6	11.2	997	1212

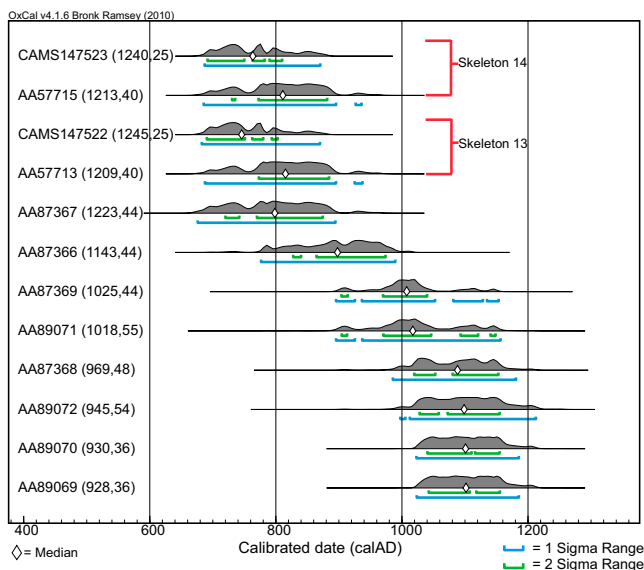


Fig. 4. Calibrated posterior probability distributions for the radiocarbon dates of skeletal remains from Room 33. Brackets below the distributions illustrate the 1- and 2- σ confidence intervals.

had deteriorated (20). Pepper found fragments of cloth adhering to several skulls. The bodies, thus, might have been wrapped in cloth and could have been moved from one location to another without losing smaller bones. Both of these factors are more likely explanations of the disarticulation of the burials than disturbance by water or some other postdeposition process.

Macrocosm

How can we understand this unusual complex distribution of bones and materials placed in the room over a span of 300 y? We suggest that multiple characteristics of the room can best be explained as an effort to establish and legitimize sociopolitical hierarchies through reference to origins, ancestors, and cosmological powers.

Many scholars recently have drawn on the concept by Lévi-Strauss (43) of house societies to understand structures as sites of potential symbolic investment by key social units or houses that may define and symbolize important social, political, and cosmological relationships through house affiliation (43–47). House societies tend to occur at periods of social transformation, whereby new forms of social inequality and hierarchy emerge in kin-based societies. For these inequalities to be accepted, maintained over time, and accorded political legitimacy in societies for which coercion is unacceptable, social differences among groups or houses often are based on the premise of autochthony (showing greater access or proximity to cosmological origins and powers) (44–48). Those powers are paramount, because they generate life and fertility.

Archaeological evidence suggests that inequality first emerged among societies in which associated changes in social organization and subsistence allowed groups to remain sedentary and cope with resource variation by storing surplus production as opposed to moving to new areas (10, 49, 50). In many cases, such groups relied more heavily on domesticated plants and animals. In instances where domesticated animals were lacking and farming was the primary focus of the economy, as in the American Southwest, groups often invested considerable time in creating and maintaining fields. Moreover, locations varied in their access to large concentrations of farmable land, and farmable areas sometimes varied in productivity, particularly when only some could be watered through irrigation. Two results of this process were increasing control of individual plots of land by groups and differential productive success among groups, both within and among

communities. Control over stored surplus seems to have been maintained by the formalization of kin-based groups that restricted sharing.

When communities and land ownership are sustained, more successful groups may legitimize, capitalize on, or simply explain their productive success by claiming greater access to ancestors and cosmological powers. Moreover, material culture often is used to show both access to and sanction from these cosmological referents. Particular groups or houses, thus, may create origin structures laden with greater quantities of particular materials that show their access to ancestral origins and powers vis-à-vis other houses. Older dwellings may be layered through time with the bones of ancestors and the material manifestations of places of origin. In societies like those in the prehispanic Southwest, the ritual, political, and social dimensions of life are often closely linked. The most preeminent individuals in a political and social sense, thus, frequently are those individuals with knowledge of the most powerful ancestral rituals.

We suggest that several particular aspects of the house model are relevant to our understanding of the mortuary crypts of Pueblo Bonito, one of three early great houses constructed near productive agricultural zones in the canyon. First, the model shifts our analytical focus to the processes by which houses are created through ritual practice and everyday life. Second, houses are conceptualized as living entities animated by prescribed actions conducted at the time of creation, ritually maintained throughout the life of a house, the materials used to create them, the powerful objects and ancestors contained within the house, and their associated connections to supernaturals. Third, cosmologically powerful materials may be associated with or clustered about what some have referred to as ritual attractors, elements of the house such as posts that are connected most directly to cosmological forces (45–48, 51).

We propose that Room 33, as well as connected Rooms 28 and 32, represent the burial of important ancestors, a practice that began during or immediately after the construction of the first room blocks at Pueblo Bonito. Burials 13 and 14 may well have been among the founders of the great house, and rather than Room 33 serving as burial repository decades after its construction as Pepper and many others have suggested, the small, inaccessible room may have been constructed as a mortuary crypt.

Equally important, the rooms also contain a wealth of cosmologically important substances (turquoise, shell, wood, cacao, sand, and ash) often arrayed in a patterned fashion. We suggest that these materials and patterns served to connect this unique burial context to a broader set of cultural referents and anchored this house (Pueblo Bonito) not only with the bodies of ancestors but also with ancestral origins and the powers of the cosmos (16, 43–47). One of the most significant patterns is the interment of Burials 13 and 14 below a floor fashioned from carefully shaped wooden planks, a very unusual pattern. The origin stories of all Pueblo groups begin with the emergence of their ancestors from the underworld (shipap) where life first began. Passage from the underworld occurred by climbing a tree (or a reed for some Pueblo groups) and exiting the underworld through a small hole in the earth, often represented in Pueblo ceremonial structures by a small hole in the floor referred to as a sipapu. The wooden floor in Room 33 may have physically symbolized the boundary of the underworld and upperworld, a proposal strengthened by Pepper's discovery that a hole 4 in in diameter had been cut near the eastern end of one of the wooden planks, perhaps as a sipapu (7).

Burials 13 and 14 also are among the most remarkable in the prehispanic Southwest. The former was interred with a large amount of turquoise jewelry that, when uncovered, totaled almost 6,000 beads and pendants. Burial 14 was even more exceptional, with more than 10,000 turquoise beads, 500 turquoise pendants, and 3,000 shell beads and pendants, along with a variety of other unusual items such as a shell trumpet. The richest

and oldest burials in the room may, thus, have been metaphorically (or perhaps, literally for the Chacoans) interred in the underworld where the first ancestors had emerged.

We suggest that other key elements of the Pueblo worldview were represented in the rooms through the types and spatial locations of the artifacts. In Pueblo cosmology (as well as in pre-hispanic Mexico and Central America), the world is structured by four directions plus the zenith and the nadir (16, 32, 33, 52). For some groups, the directions are north, south, east, and west; for other groups, they are northwest, northeast, southwest, and southeast. Plants, animals, birds, and colors typically are associated with each of the four directions, and horizontal space may be organized into four quarters. The lands of many groups are bounded by four sacred mountains, and this quadripartite organization often is replicated on smaller scales in shrines surrounding each pueblo, plazas, individual ritual structures, and key houses (16, 52).

Pepper discovered caches of artifacts in each corner of Room 33, some in association with the corner roof-support posts. The caches included more than 1,500 pieces of turquoise, all but a few of the wooden ceremonial sticks found in the room, eight of nine flutes found in the room, a rolled-up burial mat, at least two human mandibles, and a variety of other materials. The northeastern and northwestern corners of the room contained a significant proportion of the cached materials, perhaps because of ease of access from the only entrance in the eastern wall or perhaps because the sipapu was to the east. From Pepper's descriptions and field notes, we also know that he found the northeastern corner post offerings at various depths both above and below the wooden floor, revealing patterned deposition over time in room corners. Similar to the skeletal remains, the distribution of the artifacts is, thus, highly patterned (yet another indication that the distributions had not been disrupted by postdeposition formation processes), with the corner caches showing offerings to the four sacred directions, a microcosm of the Chacoan cosmos.

The posts in each corner of Room 33 also are noteworthy. Such a small room did not need five vertical roof-support posts, including two in the northeast corner; multistory pueblos were constructed in other regions and periods of the Pueblo past without such massive use of wood. Pepper observed that, at least in one case, a corner post did not even reach the ceiling. He also noted that another post was leaning against an adjacent wall. Rather than functional roof supports, the corner posts may have referred to the sacred mountains that bounded the Chacoan world. Ethnographic studies (46–48, 51) have found that beams and posts often serve as sites of ritual investment in house societies. As noted above, construction of the Chacoan great houses consumed an exorbitant amount of wood harvested in mountains as far as 70 km distant. May the abundance of construction timbers in the canyon and the placements of posts in the corner of Room 33 specifically have been created because these mountains were sacred cosmological markers within the Chacoan cultural landscape?

The abundance of materials, turquoise in particular, in Room 33 is extraordinary; however, more important was the ritual significance and power of these items, not simply as offerings to deities and cosmological forces but as a mechanism to access them and bring them forth. Many have recognized, for example, that turquoise, along with other blue-green stones such as jade, is a highly valued and powerful substance from the Pueblo region to Mesoamerica (16, 53–56). Some Pueblo oral traditions, including origin stories, emphasize the association of deities with turquoise, and the material is frequently associated in rituals and oral traditions with sun, fertility, and maleness. Turquoise and shell, often mixed with corn meal, are common prayer offerings at shrines, in kiva niches, and in the roofs or foundations of dwellings (56).

We conclude from this discussion that these objects and materials are not just indicators of great-house significance or burial status. Rather, they have more complex directional and cosmological associations that illustrate key principles of Chacoan ritual.

Given the ethnographic data for the importance of directionality in dance, prayer, and offerings in Pueblo and Navajo cultural practice, these observations should not be surprising. We suggest that these associations with directions extended from house post to the topographic locations indexed by particular raw materials; they not only referenced the structure of the cosmos but also drew in those forces.

Many scholars minimize the evidence for social differentiation in Chaco Canyon by noting that only a few interments, such as Burials 13 and 14, have significant amounts of grave goods (6, 14, 15). However, the spatial-cosmological patterns and symbolically charged materials associated with the northern Pueblo Bonito mortuary crypt suggest that the remaining dozen burials in the room and three adjacent structures were Chacoan elites with sufficient social, political, and religious status to be buried in such a sacred context associated with the bones of apical ancestors.

Thus, we propose that the long-observed disparity in burial numbers and locations between small houses and great houses in the canyon may have been a result of significant social differentiation in Chacoan society. In most hierarchically organized groups, elites constitute only a small proportion of the population. In Chaco, nonelites, even if they resided in the larger great houses, may have been interred in the abundant cemeteries associated with the small-house settlements. Only those with the highest social ranking may have been interred in great houses, where powerful and unusual objects and materials such as turquoise, cacao, cylinder vessels, and macaws were much more abundant and some of the most significant burial crypts served as microcosms of the Chacoan world. More research is still needed, however, to answer fundamental questions, such as the number of people who occupied Bonito and other great and small houses, and further explore the functions of these structures.

The limited chemical analysis of the skeletons from Pueblo Bonito is consistent with the elite status of great-house burials. The $\delta^{15}\text{N}$ values vary with protein intake and suggest that those buried in Pueblo Bonito had a diet higher in animal protein—a pattern commonly associated with elites in most areas of the New World—than other individuals from other areas of the northern American Southwest (42) (Table 1). If analysis of skeletons from small-house sites reveals protein intake more typical of other Southwestern groups, such a pattern would buttress the proposal that great-house burial was restricted to high-status individuals.

Conclusions

Reconstructions of Chacoan society have underestimated the abundance of burials and the richness and complexity of mortuary patterns. We argue that the noted disparity between great- and small-house mortuary practices was not a product of small resident populations of the great houses or an inability to locate the great-house cemeteries but a result of cultural rules that specified that only some individuals could be buried in Pueblo Bonito and other great houses.

Many scholars have noted the absence of rich burials in Chaco Canyon other than the two individuals buried beneath the floor of Room 33 at Pueblo Bonito. However, this observation fails to recognize the cultural significance of interring the 12 individuals above the floor in the same room in association with ancestors and cosmologically powerful materials and symbols. We suggest that all of these individuals were elites and Chacoan society became hierarchically organized in a manner similar to what Lévi-Strauss (43) and other have referred to as house societies.

The new radiocarbon dates show that significant social differentiation, along with the production of massive amounts of turquoise jewelry, was in place by the last half of the ninth century. The continued interment of individuals through the 10th, 11th, and possibly, 12th centuries suggests that the social differentiation soon became institutionalized. Although the significant increase in the size and number of great houses both in the canyon and the

surrounding region did not commence until about A.D. 1030, the ritual, political, and social processes that generated that expansion had begun to unfold at least a century and a half earlier.

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